

Appl. No. 10/517,877
Amdt. Dated October 4, 2007
Reply to Office Action of April 4, 2007

RECEIVED
CENTRAL FAX CENTER

OCT 04 2007

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A GaN-based semiconductor device comprising:
a GaN substrate having a low-density defect region and at least one core portion ~~portions present in~~ surrounded by said low-density defect region ~~in a periodic planar arrangement in said substrate as~~ that is a high-density defect region passing through substrate;

a multilayer structure of GaN-based compound semiconductor layers formed on said GaN substrate; and

an electrode portion ~~having an electrode~~ provided on said multilayer structure and a pad metal formed over ~~on an insulating film deposited on~~ said electrode and an insulating film, the pad metal being electrically connected through an opening of said insulating film to said electrode;

said electrode portion being provided on said multilayer structure in a region such that it does not overlap in the depth direction any portion of ~~except~~ said core ~~portion~~ portions of said GaN substrate; and further wherein the pad metal extends beyond a lateral edge of the electrode and the pad metal does not overlap in the depth direction any portion of said core portion.

2. (Currently Amended) A GaN-based semiconductor device according to claim 1, wherein ~~said periodic planar arrangement includes a plurality of core portions~~ are arranged in at least one of a continuous belt-shaped arrangement, an intermittent belt-shaped arrangement, and a dotted dispersive arrangement.

3. (Currently Amended) A GaN-based semiconductor device according to

Appl. No. 10/517,877
Amdt. Dated October 4, 2007
Reply to Office Action of April 4, 2007

claim 1, wherein said electrode portion is provided on said multilayer structure in said low-density defect region between ~~said~~ core portions adjacent to each other.

4. (Currently Amended) A GaN-based semiconductor device according to claim 1, wherein said pad metal is provided on said multilayer structure ~~in said region~~ at a position that is laterally spaced apart from ~~a the~~ center of each core portion by a distance of 100 μm or more.

5. (Currently Amended) A GaN-based semiconductor device according to claim 1, wherein said electrode is provided on said multilayer structure ~~in said region~~ at a position that is laterally spaced apart from ~~an the~~ outer edge of each core portion by a distance of 50 μm or more.

6. (Currently Amended) A GaN-based semiconductor device according to claim 1, wherein a counter electrode to said electrode is provided on ~~a the~~ back surface of said GaN substrate.

7. (Previously Presented) A GaN-based semiconductor device according to claim 1, wherein a counter electrode to said electrode is provided on said multilayer structure.

8. (Currently Amended) A GaN-based semiconductor device according to claim 7, wherein both said electrode and said counter electrode are provided on said multilayer structure such that they do not overlap in the depth direction any portion of said ~~in said region except~~ said core portions of said GaN substrate.

9. (Currently Amended) A GaN-based semiconductor device according to claim ~~8~~ 1, wherein said electrode is one of a p-side electrode and an n-side electrode, and said counter electrode is the other of said p-side electrode and said

Appl. No. 10/517,877
Amdt. Dated October 4, 2007
Reply to Office Action of April 4, 2007

n-side electrode.

10. (Previously Presented) A GaN-based semiconductor device according to claim 1, wherein said GaN-based semiconductor device comprises a GaN-based semiconductor light emitting device including a GaN-based semiconductor laser device and a GaN-based light emitting diode.

Please add the following new claims:

11. (New) A GaN-based semiconductor device comprising:
a GaN substrate having a low-density defect region and at least one core portion surrounded by said low-density defect region that is a high-density defect region;
a multilayer structure of GaN-based compound semiconductor layers formed on said GaN substrate;
an electrode portion provided on said multilayer structure and a pad metal formed over said electrode and an insulating film, the pad metal being electrically connected through an opening of said insulating film to said electrode; and further wherein the pad metal extends beyond a lateral edge of the electrode and the pad metal does not overlap in the depth direction any portion of said core portion.

12. (New) A GaN-based semiconductor device comprising:
a GaN substrate having a low-density defect region and at least one core portion surrounded by said low-density defect region that is a high-density defect

Appl. No. 10/517,877
Amdt. Dated October 4, 2007
Reply to Office Action of April 4, 2007

region;

a multilayer structure of GaN-based compound semiconductor layers
formed on said GaN substrate;

a first electrode portion provided on said multilayer structure and a pad
metal formed over said first electrode and an insulating film, the pad metal
being electrically connected through an opening of said insulating film to said
electrode; wherein the pad metal extends beyond a lateral edge of the electrode
and the pad metal does not overlap in the depth direction any portion of said core
portion; and

a second electrode formed over the GaN substrate adjacent to the
multilayer structure and wherein the low-density defect region of the substrate
extends continuously from a region beneath an outer portion of the pad metal to
the region beneath the second electrode.